

# 1. Load Rating and Service Life of Linear Motion Systems

## 1.1 Load Rating and Service Life

When determining a model that would best suit your service conditions for a linear motion system, the load carrying capacity and service life of the model must be considered.

To consider the load carrying capacity you should know the static safety factor of the model calculated based on the basic static load rating. Service life can be assessed by calculating the nominal life based on the basic dynamic load rating and checking to see if the values thus obtained meet your requirements.

The service life of a linear motion system refers to the total running distance that the linear motion system travels until flaking (the disintegration of a metal surface in scale-like pieces) occurs thereto as a result of the rolling fatigue of the material caused by repeated stress on raceways and rolling elements.

## 1.2 Basic Load Rating

There are two basic load ratings for linear motion systems: basic static load rating ( $C_0$ ), which sets the static permissible limit, and basic dynamic load rating ( $C$ ).

## 1.3 Basic Static Load Rating $C_0$

If a linear motion system, whether at rest or in motion, receives an excessive load or a large impact, a localized permanent set develops between the raceway and rolling elements. If the magnitude of the permanent set exceeds a certain limit, it hinders the smooth motion of the linear motion system.

The basic static load rating refers to a static load in a given direction with given magnitude such that the sum of the permanent set of the rolling elements and that of the raceway at the contact area under the most stress is 0.0001 times greater than the rolling element diameter. In linear motion systems, the basic static load rating is defined as the radial load.

Thus, the basic static load rating provides a limit on the static permissible load.

For the rating values of individual linear motion systems, see the respective specification tables in this catalog.

## 1.4 Static Permissible Moment $M_0$

When a moment is imparted to a linear motion system, the rolling elements on both ends receive the maximum stress as a result of the stress distribution over the rolling elements in the system.

The static permissible moment ( $M_0$ ) refers to a moment in a given direction with given magnitude such that the sum of the permanent set of the rolling elements and that of the raceway at a contact area under the maximum stress is 0.0001 times greater than the rolling element diameter.

In linear motion systems the static permissible moment is defined for three directions:  $M_A$ ,  $M_B$ , and  $M_C$ .

Thus, the static permissible moment provides the limit of the static moment.

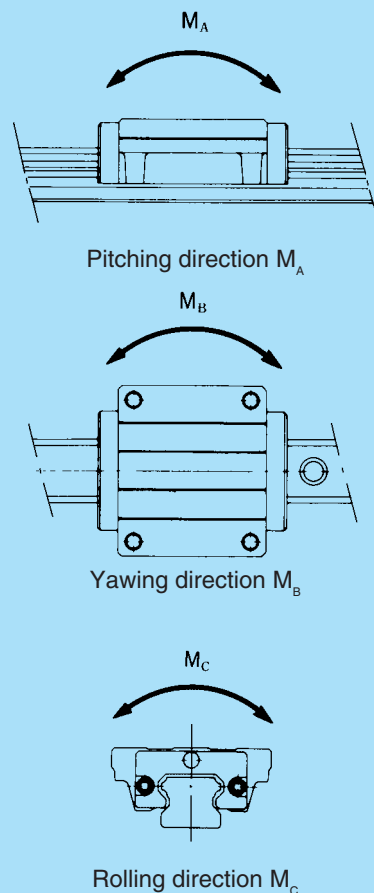


Fig. 1 Moment Direction